

My First Pinhole Camera

(Mock-Up & Final Wooden Build)

I have wanted to do a “Pinhole” camera build for quite a few years. Yes! I know, I have built and rebuilt a few cameras in my past few years, however, I wanted one that I could call my own. Most images I have seen have been a bit blurry from pinhole cameras. Yet, I have seen some really good photographs from them as well. They were so good that one can not tell the difference between an image captured by a lens camera. So.... I wanted that sort of pinhole camera.

As always with a building of most anything, I see in my mind what I want and how to go about doing the build. No blueprints, and with this - not even a rough sketch in my notebook. I just went and did it. Going to the craft store, 4 blocks away, I bought some black “foam-board”, a small razor knife, gaffer tape, glue, and a few other things.

I did not know exactly the size and distance for the exposure of a pin hole camera. So I looked up the equations needed to get it somewhat correct, and would fine tune later by experimenting. And found these:

<https://www.youtube.com/watch?v=vD-wTynubTk>

<https://www.youtube.com/watch?v=jlbmRg3nf6I>

<https://www.youtube.com/watch?v=eN613GM3xAQ>

<https://www.youtube.com/watch?v=nul5l0t9PHg>

And - From a search engine:

“How do you calculate pinhole camera?”

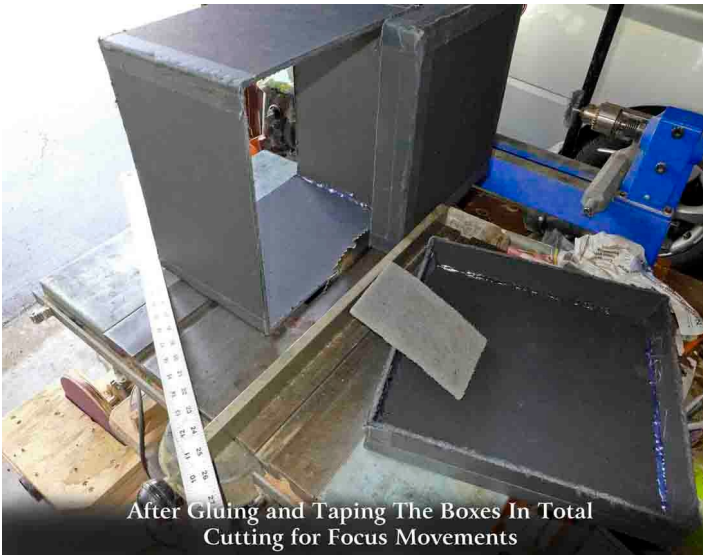
Image result for calculations for the making of a pinhole camera

The f-number of the camera may be calculated by dividing the distance from the pinhole to the imaging plane (the focal length) by the diameter of the pinhole.

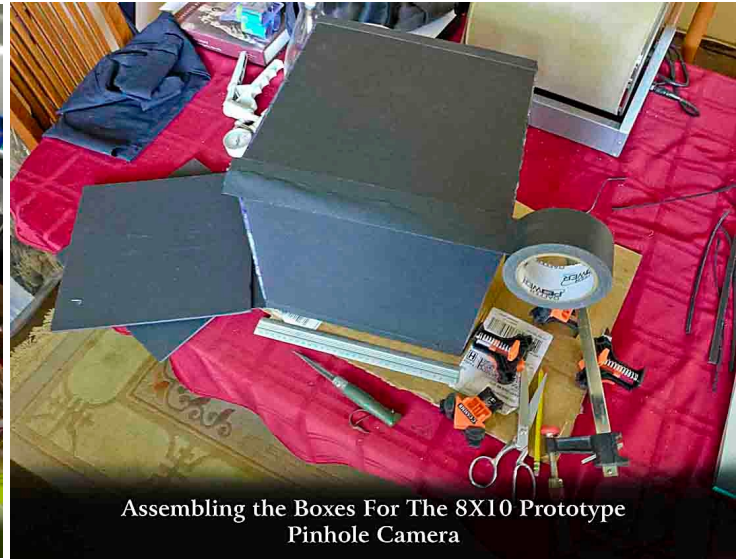
For example, a camera with a 0.5 mm diameter pinhole, and a 50 mm focal length would have an f-number of $50/0.5$, or 100 (f/100 in conventional notation).”

After seeing and reading this material I had a fairly good idea of what I needed to do for the calculation for the build. I wrote these findings in my notebook for further reference.

Cutting the foam board and the assembly was done on the kitchen table. No shop work with this particular project. (Good thing as the outside temp was about 15 degrees F. And I do not have a heated garage, where the shop is located. I did go to the shop to cut some wood for the holder frame for the rear of the camera box.)



After Gluing and Taping The Boxes In Total
Cutting for Focus Movements



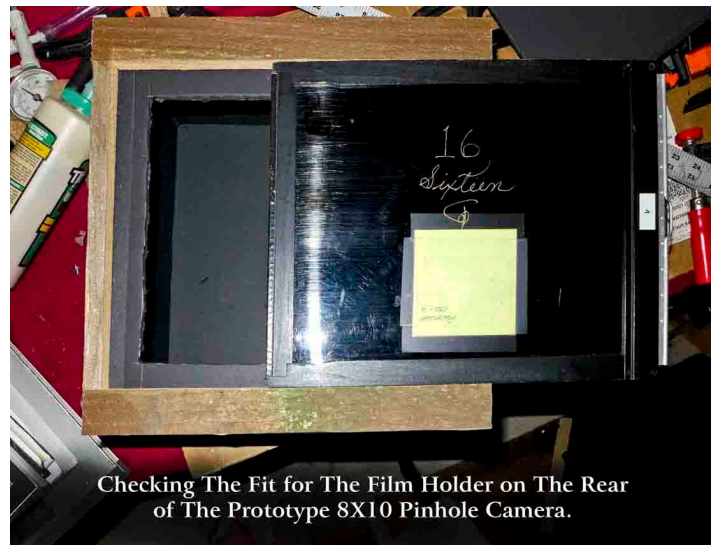
Assembling the Boxes For The 8X10 Prototype
Pinhole Camera

Next came the glueing and taping. I used a hot-melt glue gun to hold the foam board together - however - I found that there were a few places that would be a problem with "light-leaks", so I used gaffer's tape to make sure that would not be a problem. Also the tape would give additional rigidity to the structure.

Next was the cutting of the 8-1/4" X 10-1/4" opening for the "image" to cast onto the holder at the rear.

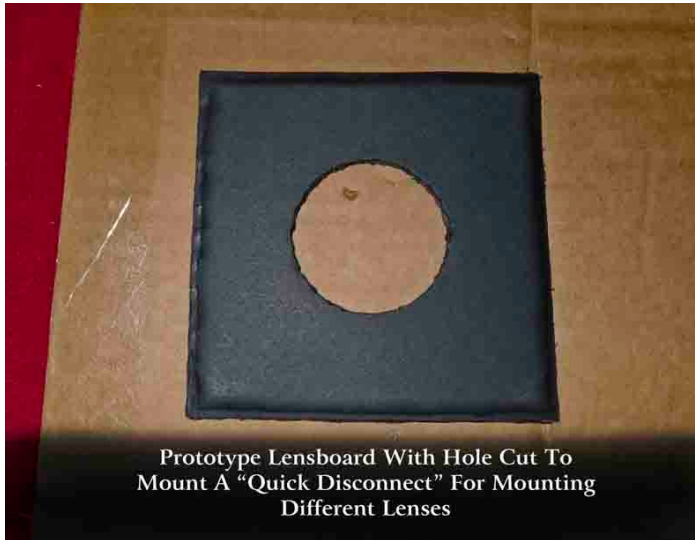


Cutting Foam Board For the Fitting on The Film Holder
At the Rear of The Camera

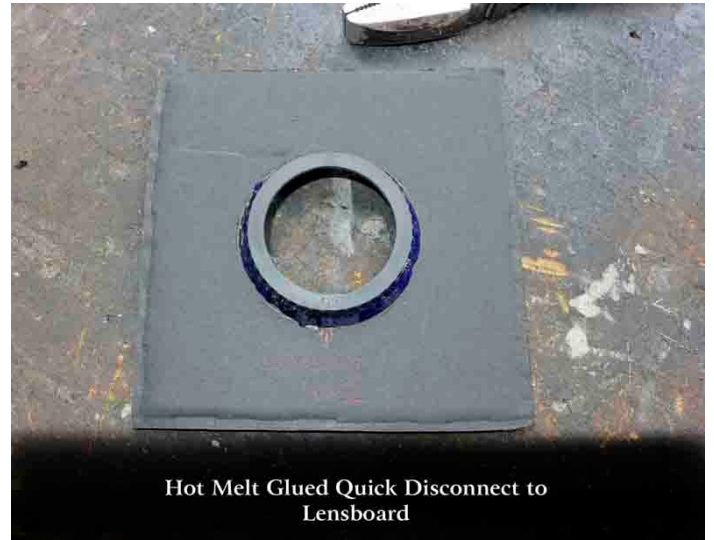


Checking The Fit for The Film Holder on The Rear
of The Prototype 8X10 Pinhole Camera.

On the front I cut a round hole for the placement of the small aperture hole. Thinking ahead, I wanted to be able to use different size holes. Being that I have a few "Lens Caps", and camera "Body Caps" I thought that for a "quick-disconnect" made from these would allow the changing of the different size holes. (I have done this to a similar project, and it worked very well to hold an assortment of different lenses.) This worked well and good.

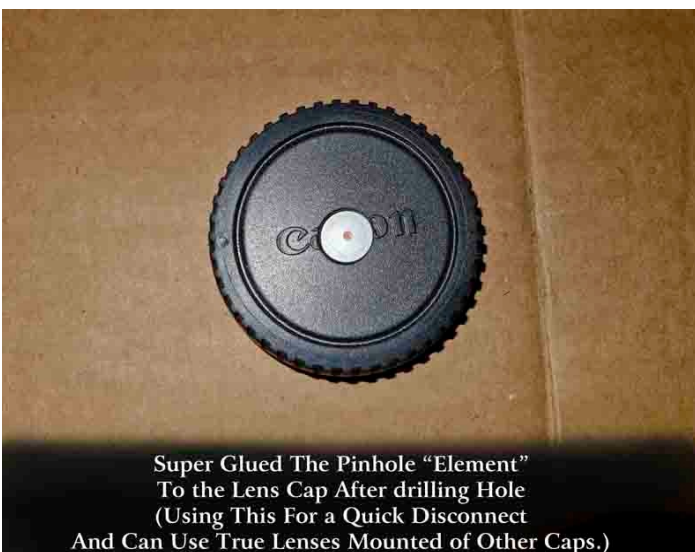


Prototype Lensboard With Hole Cut To Mount A "Quick Disconnect" For Mounting Different Lenses



Hot Melt Glued Quick Disconnect to Lensboard

I had a manufactured very small, "laser cut" aperture of .2mm. These are "normally" used on DSLR digital cameras. (Another reason for the "quick-change" idea.) However - I was not truly confident that these would work for a box for an 8X10" holder? Oh well - experimenting will prove the correct size.



Super Glued The Pinhole "Element" To the Lens Cap After drilling Hole (Using This For a Quick Disconnect And Can Use True Lenses Mounted of Other Caps.)

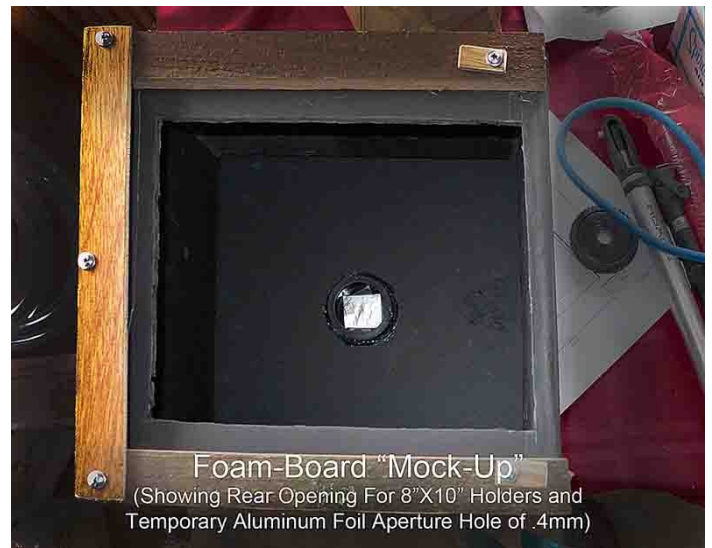


8"X10" Pinhole Prototype Foam-Board "Mock-Up"

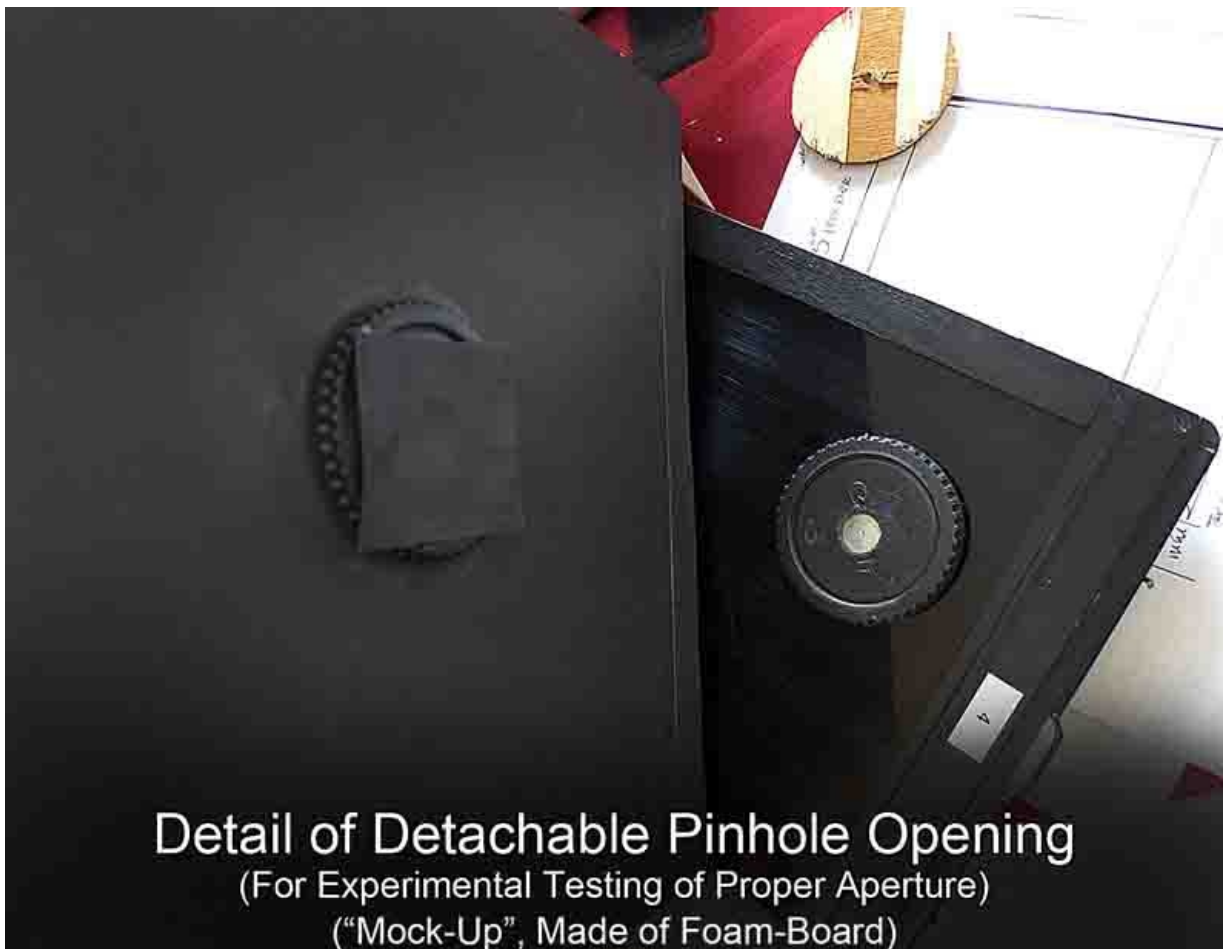
For a "Mock-Up" this is not bad - as the cutting and assemblage was completed in about thirty minutes.



Rear View of "Foam-Board Mock-Up"
With Holder In Place and Locked



Foam-Board "Mock-Up"
(Showing Rear Opening For 8"x10" Holders and
Temporary Aluminum Foil Aperture Hole of .4mm)



Detail of Detachable Pinhole Opening
(For Experimental Testing of Proper Aperture)
("Mock-Up", Made of Foam-Board)

Now came the testing of the box and different aperture size pinholes. I had tested the .2mm hole, however, I found that the outcome of the test image was a little too blurry and it took a long time to get a "correct" exposure time (Over 4 & 5 minutes.) So I tried a DIY "drilled" .4mm hole. This seemed to me to be the best that I could expect with this project. I timed the exposures with a mechanical wind-up stopwatch. The mock-up had no "shutter" - so - I used the old tried and true "taped" closure to remove when needed to get the exposure. I would use something else to make a better one with the wooden final pinhole camera later on. For now, this seemed to work well.



(Left photo was made with the "Mock-Up" camera – Right photo was from the final wooden camera)

Exposure times were between 1 and 2 minutes - .4mm hole. Paper (Arista.EDU / VC-RC) was processed in my formulation of Ansco-120-JK developer / regular Stop & Fixer - for a time of 1 to 1-1/2 minutes for full development. *(There was a light-leak because of a defective 1920 vintage holder. So please ignore that fault.)*



(Left photo was made with the "Mock-Up" camera – Right photo was from the final wooden camera)



I made the 8X10" camera because I only wanted to show others how to do a simple build of a usable pinhole box camera. Even in the fact that the "Mock-Up" was well and good to use all the time. And if anyone does not have the tools to use and make things from wood, the foam-board construction will work just as good as the wooden one.

Now - with all the written article of how I built this pinhole camera, I want everyone who reads this to know that I do have a few 8X10" Large Format cameras. I did not really have to make this one. I did it for others who want a large format camera, but somehow feel that it would be too involved to build one. Well! = As you have read, and have seen the photo illustrations, you now may proceed to DIY with a project that is not difficult nor expensive. AND One that Will give you photos that are good and reconcilable.

For those of you that do have a Large Format Camera - you would only need to make a lens board and mount the pinhole to it. AND your large format camera can be used as a "zoom" to get more or less of the area in view.



So -

As the winter months drag on (Uh! Northern Hemisphere folks) here is a little project to somewhat occupy the hours and days in the comfort of your home. You do not have to rush this project. It only took me about 30 minutes to complete, and I was not rushing it to make some "dead-line". Take as much time as you want to, be comfortable. And always remember.....

Measure TWICE — Cut ONCE.

Thank you for taking the time in reading this -

James R. Kyle, Photographer

Saint Louis, Missouri, U.S. of A. Northern Hemisphere, Planet Earth, Milky Way Galaxy